Product Information

Air Powered Man Rider™ Winch

Models LS2-150RLP-L (Lever Control) and

LS2-150RLP-PHXXM (Remote Control)

(non CE version)

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Only allow **Ingersoll Rand** trained technicians to perform maintenance on this product. For additional information contact **Ingersoll Rand** factory or nearest Distributor.

For additional supporting documentation refer to Table 1 'Product Information Manuals' on page 2.
Manuals can be downloaded from http://www.ingersollrandproducts.com.
The use of other than genuine **Ingersoll Rand** replacement parts may result in safety hazards, decreased performance and increased maintenance and will invalidate all warranties.
Original instructions are in English. Other languages are a translation of the original instructions.
Refer all communications to the nearest **Ingersoll Rand** Office or Distributor.

Table 1: Product Information Manuals

Publication	Part/Document Number	Publication	Part/Document Number
Product Safety Information Manual	MHD56251	Product Maintenance Information Manual	MHD56305
Product Parts Information Manual	MHD56306		

PRODUCT DESCRIPTION

■ Description

This product is an air powered planetary geared winch designed for lifting applications. The winches are equipped with both a multi-disc brake and a drum band brake which is automatically applied if there is a lack of air pressure. Output from an external mounted air gear motor is transmitted through a coupling and shaft to the planetary reduction. The planetary reduction drives a ring gear which is connected to the drum through the gear output shaft.
Controls: Two types of controls are available. These controls allow any speed variation determined by the operator.

- Direct lever control on winch with automatic return to neutral position, both brakes applied.
- Remote pendant control provides for remote winch control at distances up to 20 meters away from the winch. The pendant control throttle is a two function, portable control station.

SPECIFICATIONS

Model Code Explanation

Example: LS2-150RLP-L **LS2 - 150 R LP - L**

Model:

LS2 = Liftstar Winch

Capacity:

150 = (150 kg/330 lbs)

Power Source:

R = Air

Personnel Lift:

LP = Personnel Lift (Note 1 & 2)

Control:

L = Lever Control (standard)

PHXXM = Pendant Control (optional feature)
XXM = Control length
XX = Specify length in metres

Options:

A = Horizontal Wire Rope Take-off Angle (overwind)

Brakes (standard):

Automatic Disc Brake
Automatic Drum Band Brake

Standard Features:

Winch Guard
Vertical Rope Entry (underwound configuration)
Grooved Drum for 10 mm (3/8 in) Wire Rope
Pre-equipped Emergency Lowering Device
Press Roller (assisting spooling device)
Upper and Lower Limit Switches
Main Air Emergency Stop Valve
Overload Protection
Slack Line Device
Air Line Accessories (filter, regulator and lubricator)
Control Valve Lock

Documentation available on request

Material traceability certificates according to DIN 50049 (EN 10204) for load bearing parts.
Witness test by third party

Note 2:

Man Rider winch applications and limitations:
- Shall only be used as man riding winch.

Classified for use according to FEM/I Regulations:
- Class 4, strain 2, group 4M

Design temperature (TD):
- TD = -20° degrees C

Ambient air temperature between the design temperature and 40° C.

Table 2: Specifications

Air System			Rated Performance (at rated pressure/volume)							
Rated Operating Pressure	Air Consumption (at rated pressure and load)		(Full) Top Layer Line (lift)		Line Speed		Max Stall Pull 1st Layer		Winch Nominal Overload Setting	
	scfm	cu.m/min	lbs	kgs	fpm	m/min	lbs	kgs	lbs	kg
90 psig (630 kPs / 6.3 bar)	88	2.5	331	150	98	30	560	254	441	200

Sound Pressure Level **	Air Motor Pipe Inlet Size (BSP)		Minimum Air System Hose Size (inside diameter)		Drum Barrel Diameter		Net Weight *		Drum Flange Diameter	
dBA	inch	mm	inch	mm	inch	mm	lbs	kgs	inch	mm
87	0.75	19	1.25	32	13.5	342	463	210	18	450

* Weight of standard winch without wire rope.

** Sound measurements have been made in accordance with ISO 11202, ISO 3744-3746 and ISO 4871 test specifications for sound from pneumatic equipment. Readings shown are based on the average noise level of each winch configuration, proportionate to the utilized time in a regular cycle.

** Lpc (Peak Sound Pressure) does not exceed 130 dB

Table 3: Drum Wire Rope Storage Capacity

Drum Length			12 inch	300 mm
Wire Rope Diameter			13/32 inch	10 mm
Cumulative Wire Rope Capacity	Layer		feet	metres
	Operating Capacity	1st	82	25
		2nd	172	54
	Storage Capacity	3rd	279	85
		4th	384	117
		5th	495	151

■ Capacity Information

This product is designed for lifting with a 10:1 minimum design factor at rated load.

■ Traceability

Load bearing parts are documented to provide traceability. Documentation includes chemical and physical properties of raw material, heat treating, and hardening, tensile and charpy tests as required for the part. Requirements must be stated when re-ordering parts for continued certification.

INSTALLATION

Prior to installing the product, carefully inspect it for possible shipping damage. Products are supplied fully lubricated from the factory. Check oil levels and adjust as necessary before operating product. Refer to "LUBRICATION" section on page 9 for recommended oils and lubrication intervals.

⚠ WARNING

- **Product not installed properly may fall or cause a load to fall resulting in sever injury or death. Before installation refer to Product Safety Manual and all safety warnings pertaining to this product.**

⚠ CAUTION

- **Owners and users are advised to examine specific, local or other regulations, including American Society of Mechanical Engineers (ASME) and/or OSHA Regulations which may apply to a particular type of use of this product before installing or putting product to use.**

■ Mounting

Care must be taken when moving, positioning or mounting the winch. In most cases, lifting lugs have been provided to assist in handling the winch. If lug locations are improper for your specific installation, great care should be taken to ensure that winch, when lifted, will be properly balanced. Determine weight of your winch by referring to "SPECIFICATIONS" section on page 3. Add weight of wire rope and other installed options as necessary. Lift winch 3 to 4 inches (75 to 100 mm) off ground. Verify winch is balanced and secure before continuing lift.

⚠ WARNING

- **Winch frame material is not suitable for welding. Winches must only be mounted by bolting to a suitable foundation. Do not attempt to mount the winch by welding to a foundation structure.**

1. Ensure winch is positioned in a manner that allows for proper spooling of wire rope onto drum.
   Viewed from motor end:
   a. Vertical take-off - Lever movement to the left results in a drum rotation of clockwise, for lifting (haul-in). Lever movement to the right results in a drum rotation of counterclockwise, for lowering (payout).
   b. Horizontal take-off - Lever movement to the right results in a drum rotation of clockwise, for lifting (haul-in). Lever movement to the left results in a drum rotation of counterclockwise, for lowering (payout).
2. Winch mounting surface must be flat and of sufficient strength to handle rated load plus weight of winch and attached equipment. An inadequate foundation may cause distortion or twisting of winch uprights and siderails resulting in winch damage.
3. Make sure mounting surface is flat to within 0.005 in (0.127 mm) per inch of drum length. Shim if necessary.
4. Ensure the winch is correctly grounded to the personal lifting system before using.
5. Use 5/8 inch (16 mm) Grade 8 (class 10.9) or better mounting bolts. Refer to "Torque Chart" in the Product Maintenance Information Manual for proper torque values. Use self-locking nuts or nuts with lockwashers.
6. Maintain a fleet angle between sheave and winch of no more than 1-1/2°. The lead sheave must be on a center line with drum and, for every inch (25 mm) of drum length, be at least 1.6 feet (0.5 metre) from the drum. Refer to Product Safety Information Manual.
7. Do not weld to any part of winch.

Table 4: Bolt Hole Dimensions

Drum Length		Dimensions			
		A		B	
in	**mm**	in	**mm**	in	**mm**
12	300	22	560	16.5	420

Table 5: Winch Foundation Bolt Forces *

Force Acting on Bolt	Vertical Wire Rope Entry	
	lbf	N
Maximum Shear Force at One Foundation Bolt Connection	194	870
Maximum Tensile Force Shared by Rear Foundation Bolts	254	1140

* Calculated for 1st layer stall load

Maximum foundation anchor sheer force at one capscrew, value based on use of recommended fastener grade and size.

Refer to Dwg. MHP2798, on page 10 **A.** Drum.

■ Wire Rope

⚠ CAUTION

- **Maintain at least 3 tight wraps of wire rope on the drum at all times.**
- **Do not use wire rope as a ground (earth) for welding.**
- **Do not attach a welding electrode to winch or wire rope.**

■ *Wire Rope Selection*

Consult a reputable wire rope manufacturer or distributor for assistance in selecting the appropriate type and size of wire rope and, where necessary, a protective coating. Use a wire rope which provides an adequate safety factor to handle the actual working load and meets all applicable industry, trade association, local, state, federal and country regulations.

When considering wire rope requirements the actual working load must include not only the static or dead load but also loads resulting from acceleration, retardation and shock load. Consideration must also be given to the size of the winch wire rope drum, sheaves and method of reeving. Maximum wire rope diameter is limited by the wire rope anchor. Wire rope construction should be 6 x 19 or 6 x 37 Extra Improved IWRC right lay in accordance with the NF ISO 2408 standard and provide a low rotation or anti-spin characteristic.

For man riding applications, a minimum of 10:1 wire rope design factor is required with an 18:1 wire rope to drum diameter ratio.

The Wire rope size is a fixed diameter with a grooved drum. Refer to Table 3 'Drum Wire Rope Storage Capacity' on page 4.

■ *Installing Wire Rope*

Refer to Dwg. MHP2789 on page 11, **A.** Rope Entry; **B.** Wire Rope Take-off Angles (Vertical); **C.** View from Motor End or Dwg. MHP2801 on page 11, **A.** Rope Entry; **B.** Wire Rope Take-off Angles (Horizontal); **C.** View from Motor End.

⚠ CAUTION

- **Refer to data (name) plate and install wire rope for a vertical (underwound) or horizontal (overwound) condition depending upon model of winch.**
- **Ensure correct wire rope anchor is used.**
- **Make sure the first wrap of wire rope is tight and lays flush against drum flange.**
- **Ensure wire rope does not come into contact with winch guard or mounting surface when at the take off angle limits.**

1. Cut wire rope to length and fuse end to prevent fraying of strands in accordance with wire rope manufacturer's instructions.
2. Feed end of wire rope into wire rope anchor hole in the drum flange and pull through approximately three feet (1 m) of wire rope.
3. Forming a large loop with the wire rope, insert the end back into the top of the anchor hole.
4. Place wire rope wedge into wire rope anchor pocket in the drum. Install wedge such that wire rope will wrap around wedge.
5. Pull wire rope into position in the drum anchor pocket. Ensure wire rope is installed below edge of drum flange diameter. A copper drift or similar tool may be required to fully insert wire rope and wedge into anchor pocket.

Safe Wire Rope Handling Procedure

- Always use gloves when handling wire rope.
- Never use wire rope that is frayed or kinked.
- Never use wire rope as a sling.
- Always ensure wire rope is correctly spooled and the first layer is tight against drum.
- Always follow wire rope manufacturer's recommendation on use and maintenance of wire rope.

Wire Rope Spooling

To compensate for uneven spooling and the decrease in line pull capacity as the drum fills up, use as short a wire rope as practical. When rewinding apply tension to the end of the wire rope to eliminate line slack. This helps achieve level winding and tight spooling.

Rigging

Make sure all wire rope blocks, tackle and fasteners have a sufficient safety margin to handle required load under all conditions. Do not allow wire rope to contact sharp edges or make sharp bends which will cause damage to wire rope, use a sheave. Refer to wire rope manufacturer's instructions for proper sizing, use and care of wire rope.

⚠ CAUTION

- **To avoid damage to the rigging, the structure supporting the rigging and the winch, do not use with a multi reeving wire rope arrangement.**
- **Refer to DNV Standard OS E101, that provides further information regarding rigging**

Table 6: Wire Rope Ratio

Winch Series	Nominal Diameter of Sheave (mm)	SWL for Sheave
LS2-150RLP	200	1.5

Safe Installation Procedures

1. Do not use wire rope as a ground (earth) for welding.
2. Do not attach a welding electrode to winch or wire rope.
3. Never run wire rope over a sharp edge. Use a correctly sized sheave.
4. When a lead sheave is used, it must be aligned with center of drum. The diameter of lead sheave must be at least 18 times the diameter of wire rope. Refer to Dwg. MHP2449 in Product Safety Information Manual.
5. Always maintain at least three full, tight wraps of wire rope on drum.

Rigging – Harness (riding belt)

NOTICE

- **Owners and users are advised to examine specific, local or other regulations, including EN 361:2002 and NORSOK R-003 regulations which apply to harness rigging wire rope. Also, refer to Safety Product Information Manual before operation.**

Air Supply

The air supply must be clean, free from moisture and lubricated to ensure optimum motor performance. Foreign particles, moisture and lack of lubrication are the primary causes of premature motor wear and breakdown. Using an air filter, lubricator and moisture separator will improve overall winch performance and reduce unscheduled downtime.

Install air line lubricator, filter and regulator as close as possible to air inlet on motor. Lubricator must be located no more than 10 ft (3 m) from motor. Air line accessories package can also be mounted to the winch guard panel on the operators side or opposite.

Refer to Dwg. MHP0191 on page 10, **A.** Air Out; **B.** Lubricator; **C.** Regulator; **D.** Air In; **E.** Filter. Drawing is for placement order only, individual parts may vary in visual appearance.

Air Lines

Inside diameter of air supply lines must not be less than size specified in Table 2 'Specifications' on page 3. Before making final connections, all air supply lines should be purged with clean, moisture free air or nitrogen before connecting to main air inlet. Supply lines should be as short and straight as installation conditions will permit. Long transmission lines and excessive use of fittings, elbows, tees, globe valves, etc. cause a reduction in pressure due to restrictions and surface friction in lines.

Air Line Lubricator

Always use an air line lubricator with these motors. The lubricator must have an inlet and outlet at least as large as inlet on motor.

⚠ CAUTION

- **Lubricator must be located no more than 10 ft (3 m) from motor.**
- **Shut off air supply before filling air line lubricator.**

The air line lubricator should be replenished daily and set to provide 2 to 3 drops per minute of ISO VG 32 (SAE 10W) oil. A fine mist will be exhausted from control valve when air line lubricator is functioning properly.

Air Line Filter

It is recommended that an air line strainer/filter be installed before the lubricator to prevent dirt from entering the motor. The strainer/filter should provide 20 micron filtration and include a moisture trap. Clean the strainer/filter periodically to maintain its operating efficiency.

NOTICE

- **When air filter is used ensure it allows air to pass through at products rated scfm. Refer to "SPECIFICATIONS" on page 3.**

Air Pressure Regulator

The air pressure regulator is pre-set and sealed at the factory and is installed between lubricator and filter, and has a protective cover to ensure no adjustment to regulator is made unless necessary. Any adjustments shall be made by an **Ingersoll Rand** trained Service Technician.

Moisture in Air Lines

Moisture that reaches the air motor through air supply lines is a primary factor in determining the length of time between service overhauls. Moisture traps can help to eliminate moisture. Other methods, such as an air receiver which collects moisture before it reaches motor, or an aftercooler at compressor that cools air to condense and collect moisture prior to distribution through supply lines, are also helpful.

Mufflers

Ensure mufflers are installed in winch exhaust manifold and control valve exhaust port. Check mufflers periodically to ensure they are functioning correctly.

Shut Off Valve

Refer to the Product Safety Information Manual for information.

Slack Line Device

No installation to winch is required, slack wire device is adjusted at factory for proper take-off angles. Contact factory for adjustments if necessary.

⚠ CAUTION

- **Do not use slack wire device to spool wire rope onto drum.**
- **Make sure the wire rope is properly wound on the drum.**
- **The wire rope must pass underneath the rollers when coming out of the drum, so that when a tension is applied on the end of the wire rope, the slack wire device arm is lifted.**

Limit Switch

Refer to Dwg. MHP2688 on page 10, **A.** Center Nut; **B.** Payout; **C.** Haul-In.

⚠ WARNING

- **The adjustment of the top (upper) limit switch must be done at the minimum safety distance of 2 metres from the return sheave block or from the highest point the Man Rider can reach.**

Use two people to make adjustments. Pre-set limit switch settings prevent winch wire rope payout and haul-in by stopping air flow to the winch motor when a defined set point has been reached. It is the owner's and operator's responsibility to adjust winch operating limits prior to using winch.

To adjust set points:
Follow instructions in the order they appear for limit switch adjustment (**use two people to make adjustments**).

1. Remove cap from limit switch cover.
2. Partially unscrew center nut.
3. **PAYOUT**: Rotate (#1) screw counterclockwise while slowly paying out until winch shuts off.
4. **HAUL-IN**: Rotate (#2) screw clockwise while slowly hauling in until winch shuts off.
5. Tighten center nut.
6. Reinstall cap on limit switch cover and tighten.

⚠ WARNING

- **Ensure limit switch setpoints are established and operating properly before using winch.**

Emergency Lowering Device

This device allows the person to be lowered safely in case of air supply failure.

1. In the event of air supply failure, operate the three way valve from normal inlet air supply to the emergency inlet supply.
2. Open the emergency air supply (power) source. Ensure that downstream pressure is 73 to 102 psi (5 to 7 bar).

3. Operate the winch slowly to open the brakes and lower the person safely.

⚠ WARNING

- **After each use of emergency lowering device, return the three valves to the normal air inlet and check the secondary air supply (power source) is in proper working condition and able to fulfill its task.**

NOTICE

- **For the emergency air supply (power) source, a 50 litres nitrogen bottle can be used.**

■ Motor

For optimum performance and maximum durability of parts, provide an air supply of 90 PSI (6.3 bar/630 kpa) at the flow recommended in the "SPECIFICATIONS" section, as measured at the motor inlet. The winch should be installed as near as possible to the compressor or air receiver.

■ Press Roller

Ensure wire rope is positioned between press roller and drum barrel and springs keep press roller in tight contact with wire rope.

■ Pendant (optional feature)

Check that all hose connections are tight and that hoses are not twisted or crimped. Refer to Dwg. MHP1892 on page 11 for hose connections, **A.** Pendant Handle; **B.** "Emergency Stop" Button; **C.** "ON" Button; **D.** Function Levers. Pendant lengths up to 66 ft (20 m) are available. Contact the factory for pendant lengths greater than 66 ft (20 m).

⚠ CAUTION

- **To avoid damaging the pendant hose, make sure the strain relief cable, not the pendant hose, is supporting the weight of the pendant.**

■ Initial Winch Operating Checks

Winches are tested for proper operation prior to leaving the factory. Before the winch is placed into service the following initial operating checks should be performed.

1. When first running the motor inject a small amount of light oil into the inlet connection to provide initial lubrication.
2. Operate winch in both directions with no load for one to two minutes.
3. Check operation of brakes. Adjust if necessary as described in "MAINTENANCE" section in the Product Maintenance Information Manual.
4. Check operation of limit switches, locking mechanisms and all safety devices when equipped.
5. Check foundation mounting fasteners are secure.
6. Check drum guard is installed.

For winches that have been in storage, the following start-up procedures are required:

1. Give the winch an inspection conforming to requirements of 'Winches Not in Regular Use' on page 8.
2. Operate motor for 15 seconds in both directions to flush out any impurities.
3. The winch is now ready for normal use.

OPERATION

It is recommended that the user and owner check all appropriate and applicable regulations before placing this product into use. Refer to Product Safety Information Manual before operating product.

The four most important aspects of product operation are:

1. Follow all safety instructions when operating the product.
2. Allow only people trained in safety and operation of this winch to operate this equipment.
3. Subject each product to a regular inspection and maintenance procedure.
4. Be aware of product capacity and weight of load at all times.

⚠ WARNING

- **This product SHALL BE USED for the lifting of persons ONLY by means of a safety harness, boatswains chair, etc., and SHALL NOT BE USED for lifting persons by means of a platform, basket or carrier.**
- **Do not lift loads over people.**

⚠ CAUTION

- **Verify limit switch operation to ensure man riding device does not contact sheave.**

NOTICE

- **Refer to Product Parts Information Manual for drawings unless specified elsewhere.**

■ Overload Device

⚠ WARNING

- **This overload protection device is factory set at 130% maximum of the SWL at rated layer. Refer to "SPECIFICATIONS" section on page 3.**

The overload device is integrated into the winch air motor and prevents the winch from lifting a load greater than the winch nominal overload setting. If an overload is detected, inlet supply air is stopped and the winch will not operate. If the overload device is activated the load must be lowered and reduced. Alternative methods should be used to accomplish the task. To lower the load, reset the winch by pressing "ON" button of the emergency stop device and operate the winch control for wire rope payout.

■ Winch Controls

The spring loaded, motor mounted, live air manual throttle control valve is supplied as a standard feature on the winch. Optional remote throttle controls may be available on some models. The throttle controls provide operator control of the motor speed and direction of the drum rotation.

To ensure smooth operation of the winch, avoid sudden movements of the control valve. Sudden movement of the control valve may activate the overload device. If this occurs reset the winch by pressing the "ON" button of the emergency stop device and smoothly action the control valve. Ensure the winch is not overloaded.

■ *Winch Mounted Control*

Vertical Wire Rope Take-off Angle (standard):
When viewed from the air motor, depress button on control valve handle and move the handle to the left for haul-in (lowering), drum rotation is clockwise, and to the right for payout payout (lifting), drum rotation is counterclockwise.

Horizontal Wire Rope Take-off Angle (optional):
When viewed from the air motor, depress button on control valve handle and move the handle to the right for haul-in (lowering), drum rotation is clockwise, and to the left for payout (lifting), drum rotation is counterclockwise.

⚠ CAUTION

- **Refer to data (name) plate for vertical (underwound) or horizontal (overwound) condition depending upon model of winch. Refer to Dwgs. MHP2789 on page 11 or MHP2801 on page 11.**

■ *Emergency Stop*

Refer to Dwg. MHP2804 on page 10, **A.** Emergency Stop Button; **B.** "ON" Button. The emergency stop button is located at air inlet of winch on local control models, and on pendant on remote control models. When activated, winch drum rotation will immediately cease.

1. To start winch operation depress the "ON" button.
2. To operate winch, operate appropriate 'Haul-in' or 'Payout' lever.
3. In event of an emergency all winch operation can be stopped by pushing the emergency stop button. This will prevent air from reaching winch motor, engage winch automatic brake(s) and stop winch haul-in or payout movement.
4. To reset Emergency Stop Valve:
   a. Rotate emergency stop button clockwise, till emergency stop button 'pops up'.
   b. Depress emergency stop valve 'ON' button.

■ *Remote Pendant (optional feature)*

Refer to Dwg. MHP1892 on page 11**A**. Pendant Handle; **B**. "Emergency Stop" Button; **C**. "ON" Button; **D**. Function Levers.
Provides remote winch control at distance up to 20 meters (66 ft) away from the winch motor. Pilot air hoses connect the pendant to the winch motor to provide winch operation. The pendant control throttle is a two lever movable control station. Direction of winch drum rotation is determined by the pendant control lever depressed.

■ Winch Brakes

■ *Automatic Disc Brake*

The automatic disc brake is a spring applied, air released brake. When the winch is in the neutral or haul-in positions the brake air is vented and the brake spring reapplies the brake. The springs, acting on the pressure plate, compress the brake friction and separator plates and engage the brake to prevent drum rotation in the payout direction.

Automatic Drum Band Brake

The automatic drum band brake is a spring applied, air released, externally mounted brake which uses an air actuated, spring loaded cylinder to automatically disengage the brake when the motor is operated in either the haul-in or payout directions. Air pressure directed to the cylinder overcomes spring pressure to release the brake and allow the drum to rotate.

When the control valve is placed in the neutral position, the air in the cylinder is vented allowing spring tension to automatically engage the brake and prevent drum rotation.

Slack Line Device

The slack wire rope system is intended to detect a slack of the wire rope coming out of the winch drum and then stop the winch.

When lowering, in the event of slack, the slack wire device arm will go down by its own weight and activate a pneumatic switch which stops the pilot air lowering signal to the motor. The winch is then stopped with both brakes applied.

INSPECTION

Inspection information is based in part on American Society of Mechanical Engineers Safety Codes (ASME B30.7).

⚠ WARNING

- **All new or repaired equipment should be inspected and tested by Ingersoll Rand trained Technicians to ensure safe operation at rated specifications before placing equipment in service.**
- **Never use a winch that inspection indicates is damaged.**

Frequent and periodic inspections should be performed on equipment in regular service. Frequent inspections are visual examinations performed by operators or **Ingersoll Rand** trained Inspectors and include observations made during routine equipment operation. Periodic inspections are thorough inspections conducted by **Ingersoll Rand** trained Technicians. ASME B30.7 states inspection intervals depend upon the nature of the critical components of the equipment and the severity of usage. Refer to 'Inspection Classifications' chart and 'Maintenance Intervals' chart in Product Maintenance Information Manual for recommended maintenance intervals. Careful inspection on a regular basis will reveal potentially dangerous conditions while still in the early stages, allowing corrective action to be taken before the condition becomes dangerous.

Deficiencies revealed through inspection, or noted during operation, must be reported to designated personnel to ensure corrective action is taken.

A determination as to whether a condition constitutes a safety hazard(s) must be decided, and the correction of noted safety hazard(s) accomplished and documented by written report before placing the equipment in service.

Wire Rope Reports

Records should be maintained as part of a long-term wire rope inspection program. Records should include the condition of wire rope removed from service. Accurate records will establish a relationship between visual observations noted during frequent inspections and the actual condition of wire rope as determined by periodic inspections.

Frequent Inspection

On equipment in continuous service, a 'Daily Inspection' should be made by the operator at the beginning of each shift and a 'Quarterly Inspection' should be conducted by an **Ingersoll Rand** trained Inspector every 90 days and a record of the inspection maintained.

Daily Inspection

Complete inspections prior to start of daily tasks. Conduct visual inspections during regular operation for indications of damage or evidence of malfunction (such as abnormal noises).

1. **Lubricator**: Adjust air line lubricator drops 2 to 3 per minute of ISO VG 32 (SAE 10W) oil [minimum viscosity 135 Cst at 104° F (40° C)] during winch operation.
2. **Surrounding Area**: Visually check for winch oil leaks. Do not operate winch if leaking oil is found. Ensure surrounding area has no slippery surfaces and is obstruction free.
3. **Hoses and Fittings**: Visually inspect for damage, air leaks, and loose connections. Repair all leaks or damage and tighten loose connections prior to starting daily tasks.
4. **Muffler**: Visually check for restrictions or external damage. Clear restrictions or replace if damaged.
5. **Manual Shut-Off Valve**: Test shut-off valve to ensure proper operation and free movement.
6. **Wire Rope Anchor**: Verify wire rope anchor is securely installed.
7. **Guards**: Verify wire rope does not contact drum guard during winch operation and that guards are secure and undamaged.
8. **Winch**: Visually inspect winch housings, control(s), external brake, siderails, uprights and drum for damage. Check that all external bolts are in place and secure. Report damage to supervisor and request additional inspection by an **Ingersoll Rand** trained Service Technician.
9. **Mounting**: Visually inspect winch mounting bolts. Check bolts are tight, undamaged and free of corrosion.
10. **Winch Operation**: Power winch in both directions. Winch must operate smoothly without sticking, binding or abnormal noises and have minimal vibration.
11. **Control Valve or Pendant**: Check operation is smooth and winch is responsive to control device movement. Check control returns to neutral when released. If winch responds slowly or control sticks, do not operate until problems are corrected. Winch is to operate without hesitation in either payout and haul-in direction.
12. **Wire Rope Spooling**: Visually check reeving and ensure wire rope feeds on and off the drum smoothly. Verify spooling direction is correct for winch and application.
13. **Brakes**: Lift and lower the load a short distance to test brakes. Brakes must hold load without slipping. Automatic brake must release when winch control throttle is operated. If brakes do not hold load or do not release properly, they must be adjusted or repaired.

⚠ WARNING

- **Worn or improperly functioning brakes may cause excessive heat buildup and sparks.**

14. **Wire Rope**: Visually inspect all wire rope expected to be in use during the day's operations. Inspect for wear and damage indicated by distortion of wire rope such as kinking, "birdcaging", core protrusion, main strand displacement, corrosion, broken or cut strands. If damage is evident, do not operate winch until the discrepancies have been reviewed and inspected further by personnel knowledgeable on wire rope safety and maintenance procedures.

NOTICE

- **The full extent of wire rope wear cannot be determined by visual inspection. At any indication of wear inspect wire rope in accordance with instructions in "Periodic Inspection". Refer to Product Maintenance Information Manual.**

15. **Limit Switches**: Ensure limit switches engage and prevent operation at the required set point and with drum rotating in the correct direction. Ensure limit switch properly resets.
16. **Emergency Stop Valve:** Activate emergency stop in payout and haul-in directions to ensure proper operation. Valve must stop winch operation and brake must set quickly. Reset valve after test.
17. **Slack Line Detection:** Operate winch in payout direction until slack line valve actuates. Ensure winch stops operating in lowering direction, but can still lift load.
18. **Press Roller:** Ensure wire rope is positioned between press roller and drum barrel and springs keep press roller in tight contact with wire rope. Ensure smooth and proper operation.
19. **Motor:** During operation check motor housing for excess heat build up. Housing should not be hot to touch. Listen for grinding or knocking noises. If excess heat or noises are noted, do not operate until inspected by an **Ingersoll Rand** trained Technician.
20. **Labels and Tags:** Check for presence and legibility. Replace if necessary.

Quarterly Inspection

Complete a 'Quarterly Inspection' on a recurring basis to provide regular winch monitoring.
In addition to the requirements of 'Daily Inspection' also inspect the following:

1. **Power Supply:**
   - Inlet air pressure to the winch is 90 psi (6.3 bar) at full throttle with nominal system usage
   - Filter, regulator and lubricator are installed and functioning
   - Air filter is clean, drain if necessary
   - Air supply regulator is set to 90 psi (6.3 bar)
2. **Rigging:**
   - Correct size wire rope is being used, 13/32 inch (10 mm) maximum
   - Wire rope take-off angle is within design limits
3. **Visual Integrity:**
   - All Components - Inspect for wear, damage, distortion, deformation and cleanliness. If external evidence indicates damage, contact an **Ingersoll Rand** trained Service Technician to disassemble as required to conduct a detailed inspection
   - No part of the winch has been welded onto
   - Fasteners - Check external retainer rings, split pins, capscrews, nuts and other fasteners on winch, including mounting bolts
   - Drum and Sheaves - Check for cracks, wear or damage
   - Press Roller - Inspect rollers for wear and grooves. Ensure rollers freely rotate. Replace rollers if worn or grooved. Replace bearings if rotation is rough or stiff
   - Slack Line Detector - Inspect rollers for wear and grooves. Ensure rollers freely rotate
   - Ensure winch guard is capable of adequately guarding personnel
   - No modifications have been performed on the winch
   - Check motor, gearbox and disc brake for oil leakage
4. **Labeling / Marking:**
   - Data (name) plate is attached and legible
   - Warning tags and labels are attached, legible and in correct places on winch
5. **Wire Rope Spooling:**
   - A minimum of 3 dead wraps remain on drum in fully paid-out position
   - Proper freeboard is maintained at full haul-in position (minimum 1 inch (26 mm) for 10 mm wire rope)
   - Wire rope is properly lubricated
6. **Operational Checks:**

- Manual Band Brake: Connect auxiliary air supply to emergency brake release system, disengage manual band brake, lift load a short distance, and depress emergency brake release valve. Load should begin to drift downward. Apply manual band brake with emergency brake release valve still depressed. Load should stop
- Limit Switches - Operate winch in the haul-in direction until limit switch engages. Ensure winch stops operating in haul-in direction, and operates in payout. Operate winch in payout direction until limit switch engages. Ensure winch stops operating in payout direction, and operates in haul-in direction
- Line Speed - Raise and lower 5 ft (minimum distance) a 68 lbs (150 kg) load at first layer to verify line speed. Line speed to be 98 fpm (30 m/min). Line speed to be recorded after warm-up

■ Winches Not in Regular Use

1. Equipment which has been idle for a period of one month or more, but less than six months, shall be given an inspection conforming to the requirements of 'Frequent Inspection' on page 7 before being placed in service.
2. Equipment which has been idle for a period of over six months shall be given a complete inspection conforming with the requirements of 'Periodic Inspection' before being placed in service. Refer to Product Maintenance Information Manual.
3. Standby equipment shall be inspected at least semi-annually in accordance with the requirements of 'Frequent Inspection' on page 7.
4. All oils must be drained and replaced with new, and all grease cavities shall be packed to the prescribed limit. Refer to "LUBRICATION" section on page 9. Product must be operated for at least 15 seconds in both directions with well lubricated, dry air.

■ Storing the Winch

1. Always store the winch in a no load condition.
2. Wipe off all dirt and water.
3. To prevent rust buildup from internal condensation, open lubricator to allow more oil into winch and operate with no load. If winch is being stored from air source place small amount of 20 weight oil at air inlet port.
4. Oil the wire rope.
5. Place in a dry location.
6. Before returning winch to service, follow instructions for 'Winches Not In Regular Use' in the "INSPECTION" section on page 7.
7. **Mufflers and Breathers.** All mufflers and breathers must be removed and replaced with threaded plugs to prevent dust and moisture from entering motor and valve assemblies.
8. **Drum Brake.** Product equipped with a manual band brake must be stored with the brake in its disengaged position.

LUBRICATION

To ensure continued satisfactory operation of the winch, all points requiring lubrication must be serviced with the correct lubricant at the proper time interval as indicated for each assembly. Correct lubrication is one of the most important factors in maintaining efficient operation.

Lubrication intervals recommended in this manual are based on intermittent operation of winch, eight hours each day, five days per week. If winch is operated almost continuously or more than eight hours each day, more frequent lubrication will be required. Also, lubricant types and change intervals are based on operation in an environment relatively free of dust, moisture, and corrosive fumes. Use only those lubricants recommended. Other lubricants may affect performance of winch. Approval for the use of other lubricants must be obtained from your **Ingersoll Rand** distributor. Failure to observe this precaution may result in damage to the winch and its associated components.

Interval	Lubrication Checks
Start of each shift	Check flow and level of air line lubricator (approximately 2 to 3 drops per minute required at maximum motor speed).
Monthly	Lubricate components supplied by grease fittings.
	Inspect and clean or replace air line filter.
Yearly	Drain and refill winch reduction gear oil, (winch must be disassembled).

Note: Intervals are based on winch operation in a normal environment as described in "INSPECTION" section. In 'Heavy' or 'Severe' operating conditions adjust lubrication intervals accordingly.

■ General Lubrication

⚠ WARNING

- **Pneumatic winches use oil to prevent excessive heat build up and to prevent wear that could cause sparks. Oil levels must be properly maintained.**

Winches are supplied from the factory filled with oil.

Always collect lubricants in suitable containers and dispose of in an environmentally safe manner.

■ *Reduction Gear Assembly*

Replace the oil in the reduction housing once every year. If the winch is used at a normal frequency, the oil in the reduction housing is suitable for one year's operation without being changed. However, when the winch is used at a high frequency, the oil may need to be changed more often. To replace oil, disassemble winch and reduction gear assembly as described in the Product Maintenance Information Manual.

To ensure correct performance, highest efficiency and long life, it is essential that the lubricating oil be maintained at the correct level. The recommended grade of oil must be used at all times since the use of unsuitable oil may result in excessive temperature rise, loss of efficiency and possible damage to the gears.

Use only synthetic oil, Mobil SHC 629 or equivalent. To replace oil remove plug and add 5.1 oz (0.15 litres).

■ *Seals and Bearings*

If hoist is disassembled, clean all parts thoroughly and coat bearings and seals with clean grease. Use sufficient grease to provide a good protective coat.

■ *Wire Rope*

Follow the wire rope manufacturer's instructions. At a minimum, observe the following guidelines.

1. Clean with a brush or steam to remove dirt, rock dust or other foreign material on the surface of the wire rope.

⚠ CAUTION

- **Do NOT use an acid-based solvent. Only use cleaning fluids specified by the wire rope manufacturer.**

2. Apply a wire rope lubricant, **Ingersoll Rand** LUBRI-LINK-GREEN® or ISO VG 100 (SAE 30W) oil.
3. Brush, drip or spray lubricant weekly, or more frequently, depending on severity of service.

WARRANTY

Ingersoll Rand Limited Warranty
Ingersoll Rand Company ("**IR**") warrants to the original user its material handling products ("Products") to be free of defects in material and workmanship for a period of one year from the date of purchase. **IR** will, at its option either (1) repair, without cost, any Product found to be defective, including parts and labor charges, or (2) replace such Products or refund the purchase price, less a reasonable allowance for depreciation, in exchange for the Product. Repairs or replacements are warranted for the remainder of the original warranty.

If any Product proves defective within its original one-year warranty period, it should be returned to any Authorized Product Service Distributor, transportation prepaid with proof of purchase or warranty card. This warranty does not apply to Products which **IR** has determined to have been misused or abused, improperly maintained by the user, or where the malfunction or defect can be attributed to the use of non-genuine **IR** repair parts.

IR MAKES NO OTHER WARRANTY, CONDITION OR REPRESENTATION OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, STATUTORY OR OTHERWISE, AND ALL IMPLIED WARRANTIES AND CONDITIONS RELATING TO MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE HEREBY DISCLAIMED.

IR's maximum liability is limited to the purchase price of the Product and in no event shall **IR** be liable for any consequential, indirect incidental or special damages of any nature arising from the sale or use of the Product, whether in contract, tort or otherwise.

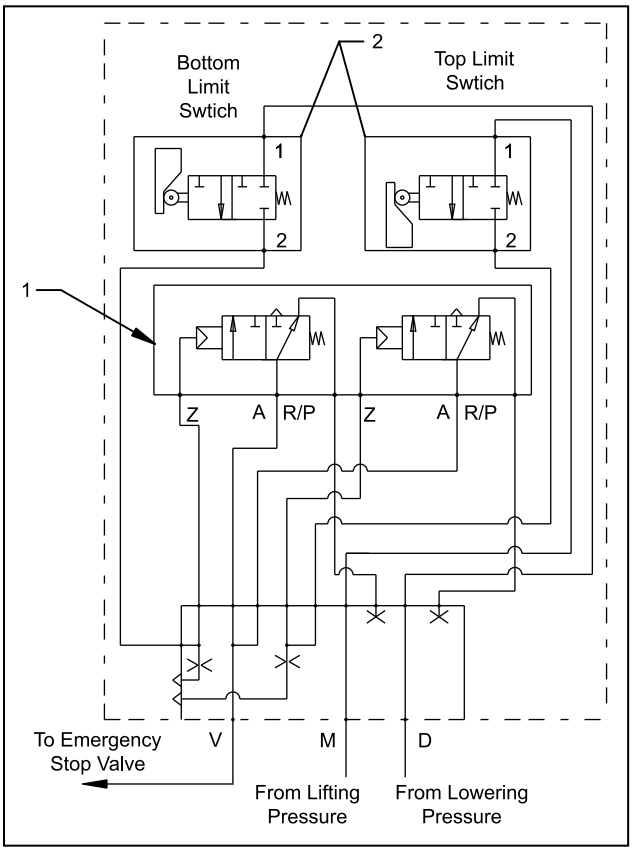
Note: Some states do not allow limitations on incidental or consequential damages, so that the above limitations may not apply to you. This warranty gives you specific legal rights and you may also have other rights which may vary from state to state.

Fulcrum series electric winch, product code 405-002: 2 year warranty.

Winch and Hoist Solutions Extended Warranty This option provides a price for extending the **Ingersoll Rand** Winch and Hoist Solutions Warranty from the standard one (1) year to two (2) years from the date of purchase. All other provisions of the standard warranty to remain in effect.

For additional information or quotations for warranties falling outside of these parameters, please contact your Client Services Representative with your requirements.

PRODUCT INFORMATION GRAPHICS



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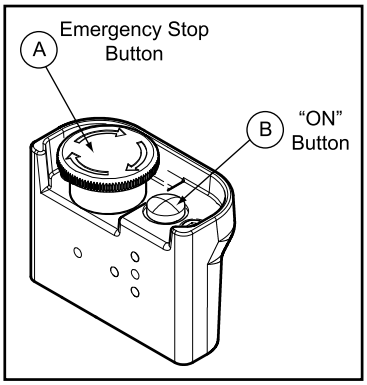

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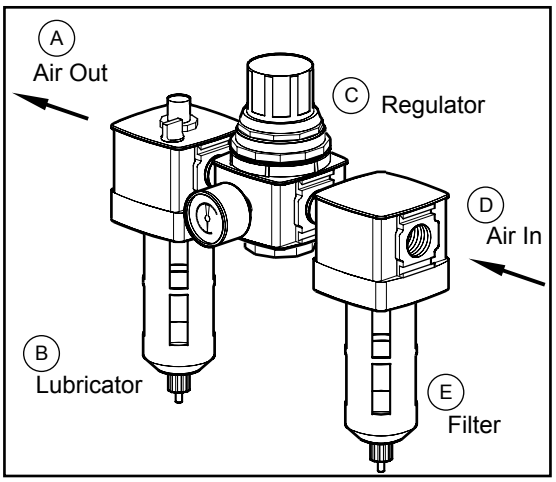

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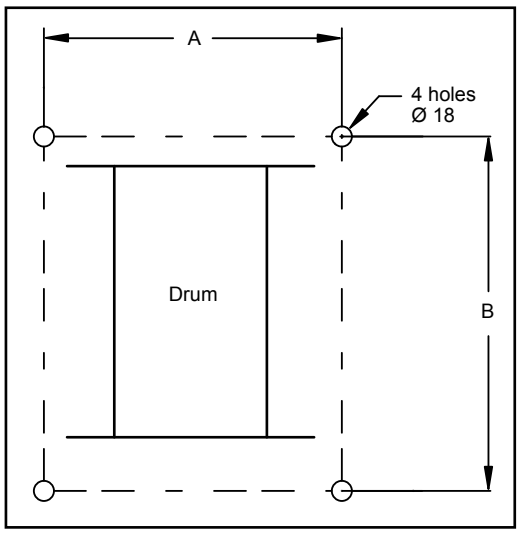

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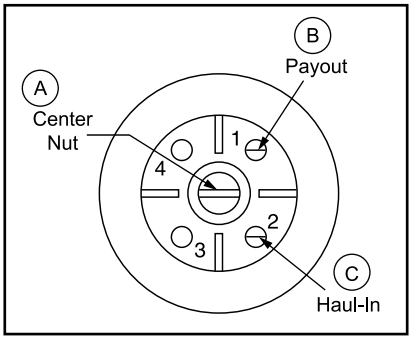

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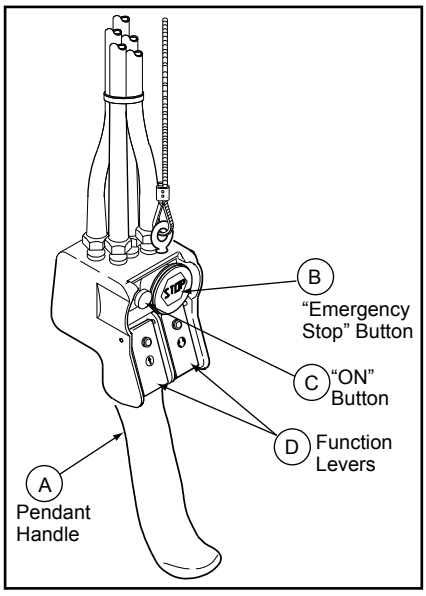

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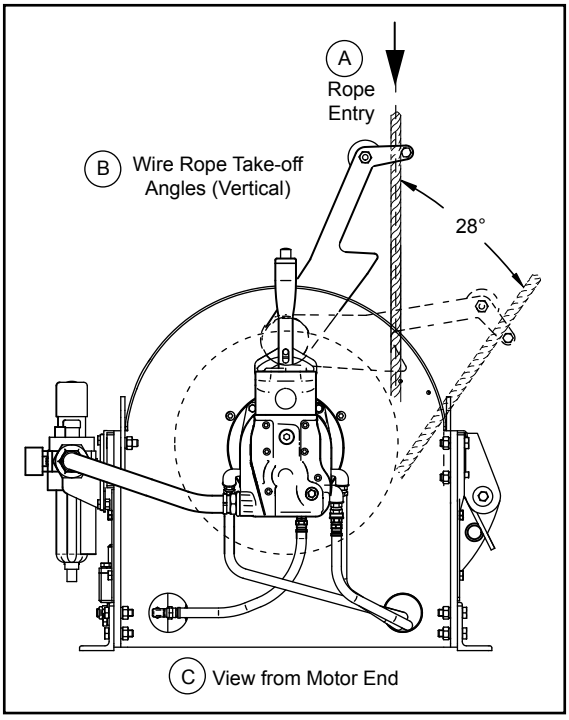

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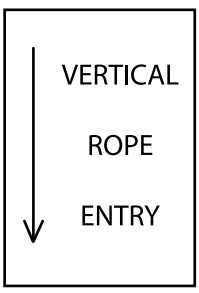

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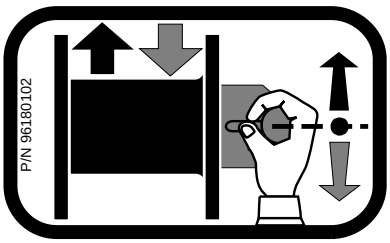

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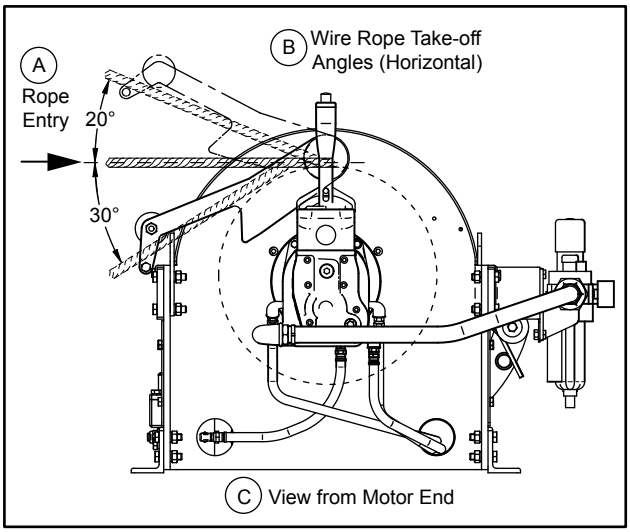

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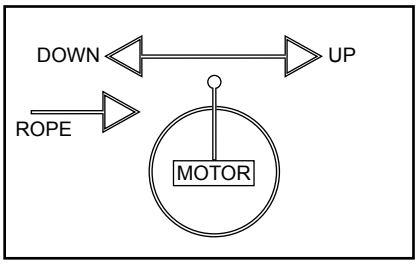

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